THE MOVE TO CLEAN FUELS

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My name is Mike Alaimo I am executive director of Clean Fuels Michigan, a trade association built of over 30 companies dedicated to the growth of the clean fuel supply chain in Michigan.

I want to first say special thanks to Rep. Bellino for his interest in this very important issue and to Committee Chair Glenn and members for taking the time to learn about vehicle electrification and the importance of charging infrastructure. I want to also thank Rep. Bellino for sponsoring a lunch and learn we will be co-hosting on May 10 in the Speaker's Library that will look further at the electric vehicle market and implications for Michigan's workforce.

***The Benefits of Clean Mobility in Michigan*, a Whitepaper**

- Commissioned by Public Sector Consultants
- High level findings around the clean mobility supply chain in Michigan
    - Contributes to nearly 70,000 jobs to Michigan's economy
    - Also contributes nearly $19 billion to the Michigan economy each year, along with over $700 million in state and federal taxes
    - Michigan is a leader in cleantech transportation patents, accounting for 22.3% of all cleantech patents in the U.S.

The Benefits of Vehicle Electrification

- EVs are three times as efficient as gasoline vehicles: 59%-62% of the electrical energy is converted into power to turn the wheels.
- Efficiency means less cost to "fuel": A typical electric vehicle can travel 43 miles for $1 worth of electricity or one-fourth of the fuel cost of gas-powered vehicles.
- Operational costs are lower. In fact, if you took into account the full operating costs of electric vs. gas-powered, the vehicles are almost cost competitive.
- **Reduced energy dependence**. Electricity is a domestic energy source. Whether it is generated by natural gas, nuclear, renewables or other sources.
- According to recent study by Midwest Evolve--Michigan could have 5.4 million EVs on the road by 2050. Financial Benefits ? According to the Midwest Evolve study's 2050 levels: **$2.6 billion in reduced electricity bills**, $23.1 billion in fuel and maintenance costs, and $5.7 billion in emission-reduction benefits.

Current/Future State of Electric Vehicles in the U.S. and Michigan

- Roughly 13,000 EV purchases in Michigan since 2011. Annual sales are expected to exceed 1.2 million by 2025, a 7% share of total annual vehicle sales. Nationally, plug-in electric vehicles and battery electric vehicles total approx. 700,000 cars on the road. U.S. - some studies show 90% of new car sales by 2040s

- The Electric Vehicle Charging Association's 2017 report, shows that while there are 10x more electric vehicle supply equipment (EVSE's) now than six years ago, data show that more infrastructure is needed in Michigan to accommodate future market growth.
- **Embracing EVs with the Deployment of Charging Infrastructure is about the economy, state competitiveness and jobs**

The Market Landscape - Growing Demand, Better Technology

- Consumer base shifts towards cleaner, fuel efficient vehicles.U.S. EV sales have grown an average of 32% annually from 2012-2016 and 45% over the year since June 2017.

Global Policies Accelerating Growth

- Countries with policies banning gas/diesel or accelerating the move towards clean vehicles is currently over half of the global market for vehicle sales.
    - China - World's largest market, phase out of gas/diesel vehicles and aggressively incentivizing EVs to target 12% of sales by 2020
    - India - Total phase out of gas/diesel vehicles by 2030
    - France - Total phase out of gas/diesel vehicles by 2040
    - Britain - Total phase out of gas/diesel vehicles by 2040
    - Austria, Norway, Denmark, Germany, Ireland, Japan, the Netherlands, Portugal, Korea and Spain have set official targets for electric car sales.

Automakers response to changes in policy and consumer demand:

Nearly every major automaker has committed to producing electric vehicles in the near future. These commitments are a response to the change in consumer demands and policies listed above.

- GM- 20 new all electric by 2023
- Ford- 13 new electrified vehicles by 2020s with focus on high-volume SUV/truck sales
- Chrysler - electrified versions of half its' vehicle fleet by 2022
- Nissan/Mitsubishi - 12 new all electric by 2022
- Honda - electrified all new european models in 2018, ⅔ new car sales electrified by 2030
- Tesla - currently all electric models, half of sales in U.S., 4th largest automaker by value
- Volvo - electrifying all new models starting 2019
- Volkswagen - electric versions of all of its vehicles by 2030
- Daimler/Mercedes Benz - 10 new electric vehicles by 2022, $11B investment in development
- Toyota - phase out of all gas engines by 2040

What Other States are Doing

- Some of Michigan's closest neighboring states are aligning resources to support the growth of clean mobility vehicles and technologies
    - Additionally, the U.S has 10 states with ZEV mandates which account for 28 percent of new-vehicle registrations in the U.S. last year, according to IHS Automotive data.
    - Indiana has developed a program called BlueIndy. The public/private venture spurred millions of dollars in investment towards charging infrastructure and

electric ride-sharing fleets in the state capital of Indianapolis. The program is now being expanded throughout the state and to other states as well

- Ohio has developed the Alternative Fueling Infrastructure Incentive, has aligned millions of dollars to encourage businesses to utilize clean transportation, and recently won Federal funding on a bid (which Detroit competed in) named the Smart City Challenge in which Columbus will become, "the nation's first city to fully integrate self-driving electric vehicles, smart grids, smart streetlights and collision avoidance sensors as part of its transportation system." see here
- Illinois has the Smart Grid Infrastructure Development and Support Program, mandates for electric vehicle charging stations at every interstate rest stop, and in addition has appropriated more than $10 million in capital funding for EV manufacturing and infrastructure grants and loans

- **The Convergence of Autonomous, Connected and Electric-** Accelerated innovation and development of autonomous vehicle technology with broad industry consensus that self-driving vehicles will be electric (see here and here)

> "So why will our autonomous future likely be an electric one? First are the regulatory reasons, namely gas mileage requirements. Then there are engineering reasons; electric vehicles are easier for computers to drive. And, of course, ride-hailing services will increasingly make up a higher percentage of daily miles driven, and it will be easier, cheaper and safer to recharge an unmanned car than to gas one up." - Greg Gardner, Detroit Free Press

- With two autonomous vehicle testing and development centers located in the state, Michigan has shown early on that the next generation of mobility technologies are an important part of the state's economic future. However, states like Ohio and Indiana are quickly becoming hotbeds for autonomous vehicle deployment because they have done more to invest in electric vehicle charging infrastructure.
- Vehicle electrification is seen by industry experts as the backbone of autonomous and connected vehicle technologies and necessary for the development of the advanced mobility marketplace.
- The need for massive investment in autonomous, connected and electric mobility technologies to compete in a rapidly changing global market, coupled with plateauing demand for traditional vehicles, underlines the need for Michigan to lead in developing a marketplace for vehicle electrification to support the state's future workforce and economy.

Studies Show Increasing Charging Infrastructure Spurs Vehicle Demand

- The National Research on Energy Laboratory (NREL) conducted a case study on Massachusetts on the possible correlation between access to charging infrastructure and number of PEV consumers.

    - Showed a strong correlation between number of registered PEV owners and number of charging locations, both public and otherwise.
    - Saw that an increase of benefits from access to charging in long-dwell charging scenarios, such as workplace charging, led to an increase in electric vehicle miles traveled and utilization of EVs.
    - Findings suggest that lowering operational costs while a market is maturing might be beneficial to its future health. As a market matures, these types of incentives will become less important.

- Real world examples of NREL findings: Kansas City and Georgia